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. . . THE . . .

COPPER MINES

. . . OF . . .

BUTTE,

AND THE

Amalgamated Copper Company.

7866.86

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GEORGE L. WALKER.

BOSTON FINANCIAL NEWS,
Publishers,
BOSTON, MASS.
1900.

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COPPER MINES

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A REPRODUCTION OF A SERIES OF LETTERS WRITTEN IN BUTTE, MONT., FOR THE BOSTON FINANCIAL NEWS, EARLY IN AUGUST, 1900, TOGETHER WITH OTHER INFORMATION FOR SPECULATORS AND INVESTORS

By

GEORGE L. WALKER

Managing Editor of the Boston Financial News

BOSTON FINANCIAL NEWS
Publishers
Boston, Mass.
1900

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Eugene F. Fay.
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INTRODUCTION.

The principal errand which called me to Butte was to investigate the truth of the often-repeated claim that the Amalgamated Copper Company's management was "milking" the Parrot and Anaconda mines, or, in other words, forcing their production and curtailing expenditures on underground development and general mining equipment in order to get the money with which to keep up 8 per cent. dividends on Amalgamated stock. I had come to half believe this claim myself, and was prepared to report the case that way if the conditions there warranted it.

My investigations convinced me that the claim referred to was not true. Under the direction of the Amalgamated Copper Company developments and permanent improvements were being pushed at the various mines in Butte with a vigor that, to say the least, was commendable. Everywhere around the mines and smelters were to be found numberless evidences that the new large interests in the coppers were not there for a temporary speculation, but that they were in the business to stay.

The contents of this book is based on information gathered in Butte; and in it is incorporated several letters written from Butte to the Boston Financial News early in August, 1900. They are here re-arranged under suitable headings, and considerable other matter added for the benefit of those who may wish a book of reference.

While it is probable that some of those errors which usually characterize hastily collected newspaper reports, have found their way into the following pages, it may not be unbecoming to me to state that no previously formed prejudice influenced me in writing what this book contains. I am not financially interested on either side of the stocks of any company mentioned herein, and my conclusions have been formed without any influence being brought to bear upon me from any source whatsoever. I went to Butte to investigate the situation for my own benefit, and the reader has it in the following pages just as it appeared to me.

Boston, Aug. 30, 1900. George L. Walker.

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HISTORICAL.

Butte Formerly a Silver Mining Camp.

The ever eager search for gold led the placer miners up to the foot of Butte Mountain, close to the Continental Divide. They examined the outcroppings of mineralized rock and found them weak in gold, but rich in silver, and they staked out their claims, and established the camp, which has now grown into a city of 60,000 inhabitants.

Near the surface the silver mines returned excellent values, and the miners grew prosperous. Experience later demonstrated that the silver deposits did not hold with depth, and just as the larger companies were getting ready to erect an extensive silver mill it was suddenly found that their mines were running into copper. A gentleman holding a high position in Butte, which he has worked up to in twenty years' service in the camp, tells the story as follows:

"I well remember when copper was first discovered on Butte mountain. The mines were down in places 200 or more feet. The first copper discovered was decidedly nice looking ore, but we all thought it a calamity. It spread a gloom over the whole camp.

"There were no railroads here in those days, and, of course, we had no facilities for treating copper ore. For a while we mined for copper glance, which ran from 40 to 70 per cent. copper, and shipped it out in the primitive way just as the early Lake Superior miners handled their mass copper. The Anaconda mine's start was largely made by the sale of copper glance.

"When Marcus Daly started in to develop his Anaconda into a large mine he had an uphill job. His associates grumbled and held back when called upon to put million after million into the ground, with only scant returns. Smelters and refining plants were built, torn down and other processes given a trial. It cost a good deal, but a couple of years' net earnings of the Anaconda mine now would pay it all back with interst."

MUCH IN LITTLE.

The Smallest District, the Largest Producer.

"Multum in parvo" expresses the impression that a visit to Butte's mines gives one. It is probably the smallest of the great copper districts, and yet it is the world's largest producer. Butte's annual output of copper now amounts to about 235,000,000 pounds, or about 25 per cent. of the world's product. Nearly as much copper is coming into the market from Butte now as from Michigan and Arizona together.

The entire copper bearing district of Butte is only about a mile long by half a mile wide, and therefore contains less than 400 acres of surface area. This is less than one-third as much ground as has already been worked out by the Calumet & Hecla mine at Lake Superior. The Calumet, however, works a lode about 13 feet wide, which dips at an angle of 38 degrees, while the Butte district is a veritable maze of nearly vertical veins and stringers, some of them 200 feet wide, and all of them carrying from one to five times as great values in copper as Calumet rock. All of the great copper mines of Montana, including the Anaconda, are producing their enormous values from this small strip of ground.

The Butte district is gradually being increased, but only to a very limited degree. Drifts, cross-cuts, and diamond drill holes from underground workings to points beyod the limits mentioned have almost invariably entered either barren ground or ores carrying small values in silver. Numerous exploratory shafts have been sunk around the Butte district, but they are either still sinking or have been abandoned.

THE VALUE OF THE MINES

In Early Days and at the Present Time.

It is said that a few years after the discovery of copper in Butte an expert visited there in the interests of the Calumet & Hecla Company, of Michigan. He examined the various mines then being opened, liked their appearance, and recommended that they be bought by that company. At that time,

according to this expert, the entire group could have been purchased for a million dollars.

Marcus Daly is understood to have paid only from twelve to fifteen thousand dollars for the great Anaconda Mine. In 1893 Boston & Montana stock sold at $15 in Boston—the equivalent of $2,250,000 for the property. Butte & Boston stock sold at 1¼ in 1896, the equivalent of $250,000 for its entire mines and equipment; Parrot was listed in Boston in 1898, and sold at 18½—$4,252,225 for its issued capital stock; and Anaconda sold at 25, Jan. 1, 1898,—on the basis of $30,000,000.

Last year the copper mines of Butte earned about $14,000,000 in profits for their owners, which is 6 per cent. on $233,333,334. The stocks of the various companies operating in Butte are now selling in the market for prices which would aggregate nearly $150,000,000.

THE AMALGAMATED COPPER COMPANY.

The Amalgamated Copper Company was organized in April, 1899. It is a New Jersey corporation, with a capital of $75,000,000, divided into 750,000 shares of a par value of $100.

This stock was offered to the public immediately after the formation of the company, and was five times over-subscribed. Only 20 per cent. of each subscription was allotted. Later the stock sold on the curb as high as 110 and as low as 76½.

Since its organization, the Amalgamated Company has paid 1½ per cent. and ½ per cent. extra, quarterly, or 8 per cent. annually. The dividends paid by the company to date aggregate $6,000,000.

Aside from the official announcement that it had already purchased large interests in Anaconda, Parrot, Washoe, and Colorado Smelting & Mining companies nothing is publicly known as to the exact nature of the Amalgamated Copper Company's assets or future plans.

The directorate of the Amalgamated Copper Company is as follows: Marcus Daly, H. H. Rogers, Wm. Rockefeller, James Stillman, F. P. Olcott, Robert Bacon, A. R. Flower, and A. C. Burrage.

THE AMALGAMATED COPPER CO.'S MISSION.

Butte, Mont.—The long looked forward to absorption of the several mines of this district by the Amalgamated Copper Company will probably never take place. All of the immense development work going on in the various properties in which the Amalgamated is known to be interested indicates that each company will continue to maintain its identity. When one comes to think about it there was never anything said of an authoritative character, which should have led any one to believe that a real consolidation was at any time contemplated by the Amalgamated's organizers.

From the best information that can be obtained here it appears that the Amalgamated Company was organized for the purpose of preventing a legal war, which would have crippled the most valuable mining district on earth. The time

was at hand when the various mining interests here threatened to become involved in such limitless litigation that that in which Mr. Heinze now figures would have paled into insignificance beside it. But the Amalgamated Copper Company was formed and became the largest individual holder of the stocks of the several leading companies. By this action the interests of all were made identical, and the various companies are, as a result, working together in peace and harmony. The several managements are for the first time in the history of this camp making a free interchange of information as to underground discoveries, smelting developments, and in numberless ways helping one another to economize expenses and earn profits. In other words harmony reigns where chaos seemed inevitable.

A map of the Butte mining district is a veritable crazy quilt. The claims extend in every direction, overlap one another and make numberless fractions. As a result the big properties of the district, each of which owns a great many individual claims and fractions, are literally dovetailed together.

The United States mining laws, which obtain in this State, give the owner of the apex of a vein the privilege of following its incline through side lines and down under the properties of others indefinitely. End lines alone confine him. An eminent expert brought here to investigate the situation testified in court that there was an average of one vein in every 12 feet across the entire formation. In view of the fact that some of the veins are 200 feet wide, notably in the Boston & Montana, there must naturally be many places where they are extremely close together. They are also connected by a veritable maze of stringers and contacts. As if to make the situation still more complex copper is seldom found above a depth of 200 to 500 feet. The United States mining laws are clearly inadequate to control such a remarkable natural condition, and the union of interests brought about by the Amalgamated Company is undoubtedly saving millions of dollars annually, which would otherwise have been squandered in litigation.

It seems to be the disposition of the Amalgamated management to act as a sort of advisory board, or perhaps managing director in all of the companies. Wherever it sees an opportunity for economy or other improvement to be secured by consolidation of one or more departments of two or more

companies, such consolidation follows. The new smelter at Anaconda, to be built and operated co-operatively by several of the Amalgamated companies, is an instance.

The changes in the heads of departments during the past two years have resulted in bringing men of ackuowledged efficiency into control of the mines and smelters in which the Amalgamated is interested; and the enormous amount of advance underground and surface development accomplished at the various mines during the past year lead many to believe that the output of the district will soon be largely increased. To say the least it looks businesslike.

It is understood on excellent authority that H. H. Rogers, at the request of Wm. Rockefeller, has decided to, from now on, give his personal attention to the affairs of the Amalgamated Copper Company. Mr. Rogers has taken a leading part in the work of building up the great Standard Oil Company. He is said to have the largest individual interest in gas securities of any man in the country. By many Mr. Rogers is believed to be one of the ablest, if not the ablest, business man in the United States.

In mining circles it is believed that the decision of Mr. Rogers to take personal charge of the Amalgamated's affairs means much for the future of the coppers. Leading copper men say that with Mr. Rogers at the helm more confidence will be reposed in the copper craft, that it will in the future carry a heavier class of capitalists and float in waters much closer to railroad and other choice investment securities.

NEW "AMALGAMATED" SMELTER.

The new smelter, now going up at Anaconda, will, it is understood, be built and operated co-operatively by the Parrot, Washoe, and Anaconda mining companies. It is possible that the Colorado Smelting & Mining and Butte & Boston companies may also be contributors, though as both own very good smelters now it is unlikely that they will.

The new smelter will be built on an improved plan invented and developed in part in the existing smelters in the Butte district. It is estimated that it will cost, when completed, from $2,250,000 to $2,500,000. The foundation will cost $250,000. Its capacity will be 5,000 tons of ore daily. All of the mistakes made in the construction of the other smelters will be guarded against in the new one.

THE ANACONDA COPPER MINING COMPANY.

The Anaconda Copper Mining Company's mines were developed under the personal direction of Marcus Daly, who is now president of the Amalgamated Copper Company. Mr. Daly is said to have bought the entire property, then a silver mining prospect, for from $12,000 to $15,000.

The property of the Anaconda consists of the Anaconda, St. Lawrence Nos. 1 and 3, Bell, Diamond, High Ore No. 2, Mountain Consolidated Nos. 1 and 2, Green Mountain and Never Sweat. Its production of copper amounts to somewhere about 120,000,000 pounds annually. From June 30, 1884, to June 30, 1898, the company produced 9,575,793 tons of ore, and from this took 1,068,922,000 pounds of copper, an average of a little more than 5½ per cent., about 111⅝ pounds of copper to the ton of ore. In addition to the copper each ton of ore yielded 4¼ ounces of silver, and about 35 cents in gold. This average has probably been improved upon in the past two years.

The Anaconda Copper Mining Compay is the result of a reorganization which took place in June, 1895. Previous to that time it was a close corporation, and there is no public record of the profits it returned, during its early existence, to its owners. Since it was reorganized it has paid a total of $13,350,000 in dividends. Lately it has been paying $1.25 and 75 cents extra, semi-anually, or $4 per share annually. The company is capitalized for $30,000,000, divided in 1,200,000 shares of a par value of $25. During the past two years Anaconda stock has sold as low as $34 and as high as $70.

The Anaconda Company earned $5,365,520 net profits last year, and paid $4,800,000 in dividends to its stockholders. At $45 per share the value of the property is represented as $54,000,000.

THE ANACONDA A GIGANTIC INDUSTRY.

Butte, Mont.—The Anaconda Copper Mining Company, a majority of whose stock is the chief asset of the Amalgamated Copper Company, is in many ways a most remarkable corporation. It is the largest producer of copper and the second largest producer of silver in the world. Besides its

several rich mines on Butte mountain it owns a reduction smelting and refining plant capable of treating 6,000 tons of ore daily; three large department stores that would compare well with the finest in Boston; three coal mines, a coaking plant, timberlands, saw mills; the electric street railway in the city of Anaconda; a steam railroad 52 miles in length; and has other assets too numerous to mention. Over 10,000 men are on its pay rolls.

The Anaconda Company's railroad, the Butte, Anaconda & Pacific, does a magnificent passenger and local freight business, besides hauling the 5,000 to 6,000 tons of ore treated daily in the smelters at Anaconda. Good authorities say that few, if any, railroads in the country have an equal mileage, which will compare with this road in net earnings. The Great Northern and Northern Pacific Railroad companies have to run their trains over this road 26 miles from Butte in order to reach the city of Anaconda.

The Anaconda smelter's output of silver amounted to 400,000 ounces in July. It averages from 300,000 to 400,000 ounces monthly. About 85 per cent. of this silver comes from Anaconda ores, the remainder from the Parrot. The company's income from the sale of silver and gold pays all of its reducing, smelting and refining expenses, and helps to pay the cost of operating its mines.

Nothing can be learned here to substantiate the claim that the Anaconda ores are changing at depth, from copper to iron. There has been a slight increase in the percentage of iron, which has operated to reduce the cost of smelting. The introduction of an increasing number of blast furnaces is due to the fact that the experience of this and other companies has demonstrated that coarse ores can be treated more economically in such furnaces. Rolls will take the place of steam stamps because by their use coarser concentrates can be made, and a large portion of them smelted in the blast furnaces. The reverberatory furnace will not be discarded. It will continue to be used to treat the fine first class ores and the finer concentrates of the second class ores.

In view of the fact that the Anaconda's immense smelting plant was built piecemeal to accommodate a rapidly expanding business, it is not surprising that it is in some ways defective. Some idea of its present size can be gained from the fact that it requires twelve trains of 50 cars each, 10 tons to the car, to haul the ore these smelters treat daily. Hundreds

of tons of sulphur are volatilized and pass off in gas through their stacks every day.

A gentleman who ought to know says: "Perhaps the Anaconda would not be a lower grade mine than the Boston & Montana if it handled no greater ore tonnage." There are so many factors in the question that even the experts would probably disagree as to the amount of selection, and as to how low grade ore should be treated. The fact that the new smelter will have a capacity of only 5,000 tons, 1,000 tons less than the present Anaconda plant, may mean that only the high grade ores of the Amalgamated group of mines will be treated in the future, and the old smelter abandoned; or it may, and probably does, mean that the output of the mines will be largely increased and both smelters kept at work.

Careful deductions made from the report filed for taxation purposes indicate that the Anaconda mined and treated last year a lower grade ore than formerly. It appears from the deductions that its ores ran about 82 pounds of copper to the ton, or a little over 4 per cent. The report in question gives the gross receipts as $18,730,131, and the net profits as $5,365,518. The latter is about 28⅞ per cent. of the former. If its copper was sold at an average of 16 cents per pound, which is a fair estimate, its profit per pound was approximately 4⅝ cents, and its production of copper 116,011,200 pounds. While it is not known how much the Anaconda expended for its extensive improvements these figures appear to indicate on the surface that the practice of treating a large tonnage of ore is an expensive one, and that larger profits would come from a more careful selection.

The action of Marcus Daly in joining hands with the Amalgamated Copper Company has been viewed by many with suspicion. "Why," it was asked, "should he, who was certainly competent to judge accurately as to its value, sell his Anaconda mine unless he was able to get for it more than it was worth?"

The best informed people say that Mr. Daly has not sold his interests in the Butte mines. He is understood to be the largest individual owner of Amalgamated stock, his holdings representing all of his former interests in the Anaconda and Washoe properties. The Hagins and other intersts are understood to have sold, desiring to release their money for other ventures into which they were then planning to enter.

ANACONDA MINE ON FIRE FOR ELEVEN YEARS.

Butte, Mont.—A fire has been burning in one of the Anaconda mines constantly for about 11 years. This fire has burned so long that most people outside of Butte who knew of its existence had forgotten it.

The fire is burning in stopes that had been refilled with waste ore to prevent caving and is slowly consuming the buried timbers, and also the sulphur in the ore, constituting a veritable underground roasting process. In places where bodies of new ore were blocked out and punctured with stopes and winzes the ore is crumbling down and burning, but there is no possibility that the ore in its natural state in the vein can ever become ignited. It is too solid.

This fire originated in one of the upper levels of the mine and has gradually worked down to the eleventh level. It has been under perfect control for several years. Some of the burnt ground is already being reclaimed and considerable roasted ore has recently been sent to the Anaconda smelter. The mine is now being worked on both sides of and above and below the fire. It still, however, has a great many years to burn before it reaches the limit of its confinement.

Years ago, when the fire covered a much larger area than it does at present, it was fought by putting a diamond drill hole down from the surface into the burning district and pouring water through the opening thus made. The contact of the water with the hot ore caused considerable of the copper to unite with the water, which upon being pumped to the surface was found to contain as high as 2½ per cent. copper.

The Anaconda, like other mines in Butte, precipitates the copper in its mine water by running it through scrap iron. A little more than a pound of iron is eaten away for each pound of copper precipitated. The precipitate is of the nature of native copper, and runs about 70 per cent. fine.

BOSTON & MONTANA CONSOLIDATED COPPER & SILVER MINING COMPANY.

Boston.—The Boston & Montana Company is not, strictly speaking, an Amalgamated property, but the Amalgamated Company owns considerable Boston & Montana stock, and the managements of the two companies are working in perfect harmony.

The property of the Boston & Montana consists of the Pennsylvania, Mountain View, West Colusa, East Colusa. Leonard, Anderson, Moose, and numerous other mining claims. It has five and a half miles of advance development, and over two million tons of ore in sight.

There is little doubt that the Boston & Montana is really the richest copper mine on earth. It produced about 70,000,000 pounds of copper last year at a cost of approximately $7\frac{3}{8}$ cents per pound. This copper was sold at a profit of about $8\frac{5}{8}$ cents per pound. In other words, between 53 and 54 per cent. of the company's gross income was clear profit.

This company is only 13 years old. Its capital stock of 150,000 shares was subscribed at par, $25, in Boston in 1887. The first dividend, $2 per share, was paid Aug. 20, 1888. It paid $4 to $5 yearly until 1894, when dividends ceased and no more were paid until 1894, when $2 a share was disbursed. From then on its dividend record was one of constant growth. Last year $36 was paid, and it is expected that shareholders will get $40 this year. Its aggregate dividends to date amount to $18,725,000. Montana stock has sold in Boston as low as $15 and as high as $400.

Bonds were issued by the Boston & Montana Company on three different occasions, the total amount sold being $2,100,000. This indebtedness has been slowly paid off until only $738,000 is left outstanding.

The directorate of the company is as follows: A .S. Bigelow, president; W. J. Ladd; Edward S. Grew; Leonard Lewisohn; Joseph S. Bigelow; Joseph G. Ray, and Frank Klepetko.

THE RICHEST COPPER MINE ON EARTH.

Butte, Mont.—The mines of the Boston & Montana Company seem to be located in the very heart of the Butte copper

district. Those who are thoroughly familiar with the situation say that the veins are much wider and richer in this property than in either the Anaconda or the Butte & Boston mines. In places one of the veins is 200 feet wide, and when it is remembered that its ores average about 9 per cent. in fine copper year in and year out, the immense value of the Boston & Montana property becomes apparent.

A great many people think that the Montana of the present will look small when compared with the Montana of the future. The mines are comparatively shallow, the deepest shaft being down only about 1,700 feet. More than three years' ore supplies are said to be constantly blocked out in advance, however.

The Montana's mining operations must entail an enormous expense. The rock crumbles rapidly after being exposed to the air, making extensive timbering necessary. About a million feet of timber, which costs $15,000, is being used monthly in the mines. The timber cannot be depended upon to hold the crumbling ground, however, and after the vein matter is taken out, the stopes are all refilled with waste ore and rock to prevent caving.

Even the water that percolates through the ground is heavily charged with copper. All iron pipes are laid in wooden tunnels, through which air circulates to prevent the iron from being consumed by this copper water. Most of the water from the various mines is carried down to the Leonard shaft, and there pumped through wooden lined pipes into a precipitator. It percolates through hundreds of tons of scrap iron, which is rapidly eaten away and copper deposited in its place. In this way about $3,000 worth of copper is collected monthly. The precipitate runs from 60 to 70 per cent. fine copper.

The equipment of the Boston & Montana mines is constantly undergoing improvement. Everywhere one goes he is impressed by the many evidences of the company's good and progressive management. It is easy for a Boston man, visiting here, to determine how the property stands in local estimation, for he is everywhere met with this question: "Can you explain why Boston & Montana stock, with the earnings the company is showing, is only selling around $300?"

BUTTE & BOSTON CONSOLIDATED MINING CO.

The existence of the Butte & Boston Company dates back to 1888. Practically all stories agree that it was for a time a victim of extremely bad management. In 1896 the stock was assessed $10 per share, and since that time the condition of the property has improved rapidly. The record of 1898 shows that more than 1,000 feet of sinking in its various shafts was accomplished that year.

The property of this company consists of the Silver Bow, Blue Jay, Berkeley, East and West Grey Rock, Michaeal Davitt, and other mining claims, and several thousand acres of placer lands, which are an immediate extension of the copper bearing zone. It is believed that the latter mentioned tract of land contains great possibilities. Considerable attention is at present being given it by the Butte management. An exploratory shaft is being sunk, and a number of drifts from the workings in the mines at present producing, are being driven under it several hundred feet below the surface. Some of these drifts are in pay ore and others are not.

Since February this year the Butte & Boston has been operating its own smelter. The lease of its smelter to the Boston & Montana expired the last day of January.

The control of the Butte & Boston Company was practically turned over to the Amalgamated Copper Company April 4, 1900, when the following board of directors were elected: Marcus Daly, H. H. Rogers, A. C. Burrage, Adolph Lewisohn, Wm. G. Rockefeller, W. J. Riley, and Jas. P. Phillips, Jr.

THE BUTTE PROPERTY AT CLOSE RANGE.

Butte, Mont.—The property of the Butte & Boston Mining Company looks decidedly different on the side of Butte mountain than it does in the columns of eastern newspapers. It is not the worthless property with superanuated plants that its enemies claim; neither is it likely to become the superior of or even the equal of the Boston & Montana as a mine.

The mining properties of the Butte & Boston occupy positions around the edges of the known copper district, only a comparatively few of them being advantageously located. A large tract of land, an unexplored extension of the copper

zone, is owned by the company, however, and work is now being conducted to determine its value. Active mining operations are being carried on through five shafts. Underground development is being pushed, and some excellent ore is being sent to the smelter.

A great deal of money has been spent on the Butte & Boston smelter during the past two years. It has been brought fully up to date in all but one or two departments, and to-day it is one of the best smelting plants of its size in the State of Montana.

In the same two years more money has been expended on the mines than on the smelter. The mines have been extensively opened up under ground, and the ore reserves are now sufficient to supply the smelter for a long time. As to the actual value of the underground showing, however, nothing definite can be learned.

Like all other mines in the district the Butte sorts its ores underground into first and second class. The first class ore is smelted direct in blast furnaces, and the second class is milled, washed and the concentrates treated in reverberatory furnaces. Its concentrator has been brought fully up to date. Rolls are used for crushing, and they do much better work on the Butte ores than the steam stamps used in the old Anaconda mill. The first jigs in the Butte mill save concentrates as coarse as egg coal, and these are treated in the blast furnaces.

The Butte smelter is a steel building. Its capacity is between 650 and 700 tons daily. The Butte buys and treats considerable custom ores, and makes a good profit on the operation. As the smelter is in Butte, close to the mines, a great deal in freight costs is saved. Whenever the smelters need more of any particular class of ores to improve their flux they are purchased from the Anaconda, Parrot or Washoe. Considerable ore from the latter mine is now being treated at the Butte smelter.

Twelve Wilfley tables have recently been installed in the Butte mill. By their use 12 tons of concentrates are saved every 24 hours that were previously entirely lost. These concentrates average better than 12 per cent. metal, and consequently about one and one-half tons of fine copper is thus being added to the company's output every day.

Butte ores are reduced by its smelters into black pig copper, about 98@99 per cent. fine. This is treated by electro-

lysis in the East. It carries on an average 100 ounces of silver to the ton of metal.

Considerable of the Butte property is tied up in litigation, and after the settlement of the suits it will be more easy to determine the intrinsic value of the company's stock. A gentleman who is well acquainted with the property says: "I would hesitate about buying Butte at its present price, and under present conditions for an investment. If the suits were out of the way and the company had its mines back, however, I should consider it a good buy."

It will be remembered that the report of the Butte & Boston Company, filed for purposes of taxation, showed net earnings last year of $571,310. It is probable that fully as much more was put into advance mining development work. surface and smelter improvements. This year's earnings will be larger than last year's, and as there are no further heavy expenditures to be made net earnings should be considerably in excess of one million dollars, perhaps enough to warrant annual dividends of $6 on the stock.

At least three of the Butte Company's mines are showing excellent values, and give good promise of developing into large and permanent producers. They are the Grey Rock, Berkley, and Blue Jay.

The Grey Rock Mine is at the north end of the copper zone. Indeed, the natural division line runs through it, and about one-third of the claim contains practically no copper, what values there are being in silver ore. In the remaining two-thirds of this mine, however, the veins contain good values in copper.

The fact that the Butte Company cleaned up more than half a million in profits last year, while the mine was being operated primarily in the interest of development, is in itself a refutation of the claim that the property has no value. It is learned on very good authority that Butte is now producing about as much copper as the Parrot, or approximately 20,000,000 pounds annually. According to the statements recently filed at Helena, the average yield of Butte's ores last year was $14.61 per ton. The Anaconda reported an average yield of $13.18; and the Colusa-Parrot only $8.93. Statements of averages for the ores of other Butte mines were not made in the reports.

THE PARROT SILVER & COPPER COMPANY.

A large majority of the stock of the Parrot Silver & Copper Company is understood to constitute one of the important assets of the Amalgamated Copper Company. It was reported at the time that the Amalgamated Company purchased the Parrot that the price paid for the stock was $40 per share. This report was never confirmed, however.

The Parrot Company's issued capitalization amounts to $2,298,500, divided into 229,850 shares of a par value of $10. Its stock came on the market in Boston in 1898, and sold at 18½. That was its lowest, and in the boom it advanced as high as 72½, and later dropped as low as 31½.

The directors of the Parrot Company are as follows: Marcus Daly, C. D. Burrage, C. H. Dickey, Sidney Chase, A. W. Bemis, E. G. Story, and R. D. Willard.

PARROT'S DEVELOPMENT AND DIVIDENDS.

Butte, Mont.—From the best information that can be gained here it does not appear that the claim that the Amalgamated management is "milking" the Parrot Mine to get money with which to pay dividends, has any foundation in fact.

Those in a position to know pretty nearly the exact facts say that the Parrot is producing at the rate of about 20,000,000 pounds of copper a year. Its ores are treated at the Anaconda smelters at about cost, and it is conservatively estimated that the company's profits this year will amount to $1,600,000, or 8 cents on every pound of copper produced. To pay $6 dividends $1,379,100 will be required, and this will probably leave a balance for emergencies of $220,900.

It is understood that when the Parrot came into the hands of its present owners it had in its treasury nearly two million dollars, which had been reserved by the former management for the purpose of retimbering the shafts and building a smelter. A part of this surplus, about one-third of it, was expended last year in underground developments and retimbering.

The excitement about the Parrot paying more in dividends than it earned last year was due to its heavy expenditures for

improvements. Its statement for taxation purposes showed only its net gains over expenditures, and in the latter was included the large construction item. Had this been charged against the treasury reserve, accumulated for that purpose, and the dividends against the earnings from mining operations, the report would have looked different.

In the middle months of 1899 it was said that the tenth level of the Parrot Mine was one of the most barren spots underground. The shaft was driven to the twelfth level, and not even a station cut at the eleventh. At the twelfth the crosscut to the ore body cut the lode some time in the Winter. Since then it is understood the workings have been in a very rich vein.

The Parrot is one of the oldest mines on Butte mountain. It was worked nearly twenty years before it passed into the hands of the Amalgamated people, and as only the tenth level had been reached in all that time it would naturally follow that normal development could more than be maintained now by sinking 100 feet annually. The fact, therefore, that the principal shaft is now going to the sixteenth level would seem to prove beyond question that the new management is not only keeping up the mine's advance development, but increasing it as rapidly as practicable.

The Parrot property occupies a large area in about the best part of the Butte copper district. Mining operations are being carried on through two shafts, and two more shafts are being sunk for the purpose of exploration. Unless this exploratory work developes something new in the way of ore bodies it is not probable that the Parrot will in the future much more than maintain its present volume of production. Its current output is very nearly as much as can be mined economically from the veins now being exploited.

It is probable that the fire, which destroyed the surface plant of the Parrot Mine, Aug. 8th, will cost the company approximately $220,000. The loss, over and above the insurance on the buildings, is estimated at $60,000; and it is claimed that hoisting will again be underway in six weeks. Profits of about $160,000 will be lost in the period mentioned, which, added to the fire loss, will bring the total up to about $220,000.

In view of the policy that the Parrot Company has followed during the past two years it is not probable that dividends

will be cut as a result of the fire. The company has something over a million dollars in its treasury, which was reserved for renewals and improvements. It is probable that this reserve will now be drawn upon to provide the mine with modern hoists and machinery to replace that burned.

The returns from the operations of the Parrot's old concentrator and smelter on tailings, which has been going on for over a year, are not great. There may be a profit of $100,000 annually coming from this work, and possibly a little more. If it returns only one-half as much as it here estimated, however, the game is well worth the candle.

COLORADO SMELTING & MINING COMPANY.

The Colorado Smelting & Mining Company is the smallest of the Amalgamated properties in Butte. It operates one mine, the Gagnon, and besides does a very good business at its smelter treating custom ores. Last year the company reported profits of $142,580. It has paid a total of between $300,000 and $500,000 in dividends.

The Colorado Smelting & Mining Company is capitalized for $1,000,000, divided into 100,000 shares of a par value of $10. It is understood that practically all of this is owned by the Amalgamated Copper Company.

THE SPECLATOR MINE.

The Speculator Mine is a small independent property, located in the Butte district. It is owned and worked by the J. A. Creighton and Largely estate. It is understood to produce about 1,000,000 pounds of copper annually. It earned in net profits last year $92,185.

MONTANA ORE PURCHASING COMPANY.

The Montana Ore Purchasing Company, the property of F. August Heinze, owns the Rarus, Johnstone, Glengarry, Cora, Copper Trust, Parnell, fractions of the Snohomish and Tramway, and other mining properties in the Butte district. Its principal mine is the Rarus. The Copper Trust, Cora, and one or two other properties are not now being operated, apparently having been abandoned.

This is one of the newer of the Butte properties, having been operated first in 1891 by a co-partnership consisting of F. Aug. Heinze, Stanley Gifford and others. It was incorporated in 1893, with a capital of $2,500,000, divided into 100,000 shares of a par value of $25. Only 80,000 shares have been issued. It has paid a total of $1,516,000 in dividends to date. The stock is not a speculative feature.

The officers of the Montana Ore Purchasing Company are as follows: F. Aug. Heinze, President and General Manager; John MacGinnis, Vice-President; Arthur P. Heinze, Secretary, and Stanley Gifford, Treasurer.

The smelter of the Montana Ore Purchasing Company has done a large business since it was established, and has unquestionably returned good profits to its owners. Formerly the company bought a great deal of custom ore. At present its furnaces are employed almost entirely on its own ores, and ores from some of the properties now being operated by receivers.

Two additional blast furnaces are at present being installed in the smelter. A new stack has recently been erected, and it is possible that the company's output will be increased somewhat next year.

The Montana Ore Purchasing Company is understood to be producing at present about 15,000,000 pounds of copper annually. Its returns to the assessors showed net earnings of $400,000 for the year just ended, which is the same as was returned for the year previous.

W. A. CLARK'S COLUSA-PARROT.

The Colusa-Parrot Mine is operated by a close corporation, of which W. A. Clark is understood to be the chief if not the sole owner. Its stock is never traded in on the market, and aside from the mine's importance as a producer of copper the public has very little interest in it.

COLUSA-PARROT A LOW GRADE MINE.

Butte, Mont.—Butte copper people credit the Colusa-Parrot with a production of from 10,000,000 to 12,000,000 pounds annually. Its return to the assessors showed net earnings last year of $325,044; and the statement in connection with its return that the gross yield per ton of ore was $8.93 would indicate that it is one of the lowest grade properties in the Butte camp.

Mr. Clark's holdings in the Butte district are very limited in area. His Colusa-Parrot is only 150 by 298 feet on the surface. This is his most valuable property. In addition to it, however, he owns the Burt, Woolman, Home, Stewart, and Dives.

The fact that Mr. Clark, though one of the first men on the ground, secured so small a portion of the valuable properties here, has often been urged against him as an evidence that he lacked business ability. A few years ago, report says, his entire holdings were offered for sale for about $1,000,000. That was when copper was cheaper. At present they would unquestionably be worth considerably more than a million dollars.

Litigation is pending between the Colusa-Parrot and the Anaconda. The latest decision gave the Colusa-Parrot Mine to the Anaconda. This, however, was appealed; but should the higher court sustain this decision Mr. Clark will lose the best of his Butte producers.

WASHOE COPPER COMPANY.

The Washoe Copper Company was formerly a Daly property. A controlling interest in its stock was sold to the Amalgamated Copper Company at the same time the Anaconda Company went into the deal.

The Washoe now has a capital of $20,000,000 divided into 200,000 shares of a par value of $100. Its capital was increased from $5,000,000 to $20,000,000 at the annual meeting last February. The stock represented at that meeting was 30,464 shares, out of a total of 50,000. It was said at that time that the Washoe's liabilities were $112,787. The circular calling the meeting, announced that the increase in capital would be used for the "extension of the company's interests."

In view of the fact that the $15,000,000 added to the capital stock of the Washoe Company was never offered to the public, it is generally believed that it was paid for out of the treasury of the Amalgamated Copper Company. It was this large increase in capital which sent abroad the impression that the new smelter at Anaconda was to be built by the Washoe Copper Company alone.

The property is, as Butte properties go, a large one. Development work has been pushed underground for several years. The ore taken out in development is being treated principally at the Butte & Boston smelter. The Washoe is already a large mine, but it is the intention of the new owners to make it even larger before beginning regular production.

If the Amalgamated people were to experience any difficulty in getting together sufficient money with which to pay dividends the Washoe could undoubtedly be made to return profits immediately. For smelter capacity the treatment of tailings at the old Parrot smelter could be discontinued to make room for rich ores, and the custom business now done at the Butte & Boston and Colorado smelters could also be side-tracked to make way for the Washoe output.

By continuing extensive and expensive development work at the Washoe and Butte & Boston mines, both of which could be, if desired, turned into dividend payers at a month's notice, the Amalgamated management is certainly leading unprejudiced people to believe that it is not at present pinched for money.

THE HEINZE LITIGATION IN BUTTE.

Butte, Mont.—A careful investigation makes it appear that the importance of the so-called Heinze litigation has been greatly over-estimated. It is very important to Mr. Heinze; but much less so to the Amalgamated Copper Company.

Mr. F. August Heinze is a bright, energetic young business man, whose pleasing and generous personality has surrounded him with a host of admiring friends. He is not by any means the fiend incarnate that many of his enemies have come to believe, nor yet is he the mining and metalurgical wizard that his over-enthusiastic followers have pictured him. While he has gained the reputation of preferring lawsuits to diplomatic negotiations, the writer is not certain that Mr. Heinze is altogether responsible for all of the 200 or so suits into which the mining companies on Butte mountain have been plunged. That he is responsible for a good half of them, however, cannot be denied.

The claim that Butte people are divided into two hostile camps, one Heinze-Clark and the other Amalgamated-Bigelow is lamentably true. Business men, clerks, miners, hotel porters, cab drivers, and even bootblacks, all take a decided stand for one side or the other. The fight has paid millions to lawyers and courts, and now it has been taken into State politics, and will be the leading issue in this fall's campaign.

Mr. Heinze claims that there is a conspiracy to drive him out of the camp; that the fight was forced upon him, and that his opponents have shown a disposition to stoop to all kinds of dishonest methods to carry their point. The other side claims that Heinze's Rarus, and Nipper mines are of no real value, and that the ore being taken from them is obtained through cross-cuts from veins which really apex on Butte & Boston, Boston & Montana, and Parrot property. It is also believed by Mr. Heinze's enemies that the present eight-hour movement in the Butte mining district was instigated by Mr. Heinze for the sole purpose of assisting politically his friend and colleague, Senator Clark. It is even rumored that Mr. Clark is making up to Mr. Heinze what he loses by paying his men 10 hours' pay for 8 hours' work.

The works of Messrs. Clark and Heinze employ about 1,500 men and those of the Amalgamated group and Bigelow

mines, more than ten times that number. None of the men in the smelters get less than $2.50 per day and the range for this class of help and miners is upward to $3.50 per day, a very large proportion receiving the highest figure.

The reports for the year ended June 30, filed at Helena, for purposes of taxation, by the various mining companies of Butte, form an excellent basis for determining the relative value of the interests of the Amalgamated-Bigelow and Clark-Heinze people. A leading mining official of Butte, who was questioned as to the reliability of the reports referred to, replied: "The reports were submitted on oath, and unless the people filing them perjured themselves, the figures are reliable."

The returns of net earnings of the larger group of properties were: Boston & Montana $6,073,150; Anaconda $5,365,520; Parrot $800,655; Butte $571,310; Colorado Mining $142,580; a total of $12,953,215. These properties are estimated to have produced an aggregate of 233,000,000 pounds of copper last year. If they did, their net profits amounted to 5⅝ cents for every pound.

On the other hand, the Montana Ore Purchasing Company, Mr. Heinze's property, returned net earnings of $400,000, and Mr. Clark's properties $326,690, a total of $726,690; a fraction less than 6 per cent. of the total profits of the camp. If Clark and Heinze produced their copper and sold it so that it returned them the same average net profit per pound that the Amalgamated mines saved on their output their product was only 12,778,560 pounds.

Although the output of the Amalgamated-Bigelow group of properties is estimated, these deductions are nevertheless equally fair to both sides. If the large companies produced less than the estimate, it necessarily follows that their net profit on each pound of copper was correspondingly larger. If Heinze and Clark produced more than the above deductions indicate, it necessarily follows also that their net profit per pound of copper was correspondingly smaller.

As a matter of fact Heinze and Clark's properties are credited by Butte people with having produced at least 25,000,000 pounds of copper last year. If the local estimates are correct, and it is quite certain that they are none too high, the net profit per pound saved by their properties was not more than half as great as the Amalgamated-Bigelow properties were able to show.

This naturally calls up the question of the smelting and metalurgical ability of Mr. Heinze. He unquestionably deserves the credit of having first introduced into the smelters at Butte a number of labor-saving devices. His smelter has been equipped with the McDougal roasting furnaces for five years. Neither the Butte nor Anaconda smelters have them yet. The Boston & Montana Company began introducing them two years ago; and an improved style of this furnace will be used exclusively in the new smelter at Anaconda. Roasting furnaces, however, are only a small part of a smelter. The following is a better comparison: the Montana Ore Purchasing smelter treats 500 tons of ore daily, and employs 300 men. The Butte & Boston smelter is treating 650 tons of ore daily and employing only 270 men.

Of course it is possible that Mr. Heinze encountered obstacles in his operations last year of which no public mention has been made. It should be remembered at the same time that while the larger group of properties were obtaining about 100 per cent. better net results than Mr. Heinze did they were hampered by the disadvantage of having to treat at least 90 per cent. of their product in the antiquated Anaconda smelter, of which columns of abuse have been printed. Mr. Heinze is a bright, progressive young man; but the claim that in his ability to treat ores he comes in a higher or even the same class with the men who look after the Amalgamated Copper Company's affairs in Butte does not seem to be borne out by the figures of results.

The further claim that the Amalgamated group of mines in Butte has been "milked" to pay dividends on Amalgamated stock lacks confirmation here. Those who are in a position to know say the past two years have seen the greatest improvements in these mines that have been made in any like period in the past decade. The improvements are here; any one can see those above ground.

The so-called Heinze litigation, though about as many of the suits have been brought against as by the gentleman named, affects about ten acres of ground out of the 400 which constitute the copper district. It is estimated that these suits aggregate in fees and costs of courts about $350,000 annually. The greatest expense connected with this litigation, however, is for so-called "dead work," which means the numerous underground cross-cuts and drifts to expose the formation and veins for the benefit of judges, juries and experts. This

cost, of course, goes on the books as mining expenses, and as Mr. Heinze apparently had to bear one-half of it it may explain the relatively low returns on his last year's operations. The half of the $350,000, borne by the Amalgamated-Bigelow people, amounts to about 1⅜ per cent. of the $12,953,215 profit earned by their mines last year, while Mr. Heinze's half amounted to 43¾ per cent. of the $400,000 earned by the Montana Ore Purchasing Company.

So it would seem that the Amalgamated Copper Company has some decided advantages in this litigation. It should be able to stand this light financial drain for ages, and if copper properties are closed by the litigation the effect on the copper market due to the slight curtailment of production will certainly redound much more to the Amalgamated Copper Company's benefit than to Mr. Heinze's. So far as the Amalgamated is concerned, therefore, the litigation is little more than an irritation. Compared with the company's ability to pay it certainly cannot be called expensive.

THE WORK OF THE SMELTER.

How the Ores are Converted into Copper and Silver.

The ores from the mines of Butte go through several stages of treatment before the refined metal is ready for the market. The system of treatment employed in the smelters at Anaconda, Great Falls, and Butte has been gradually developed, and is the result of bringing together the best product of the schools of metalurgy and the practical every-day smelter men in reduction plants where a heavy tonnage is handled.

The ores of the several Butte mines are sorted into first and second class before being hoisted to the surface. The first class includes the heavy black sulphides, copper glance, ores heavily charged with iron, and some others. Second class ores are made up of the lower grade, and the ores carrying a large proportion of silica. The latter ores are easily distinguished because of their whiteness.

The silica ores are sent to the concentrator, which is the equivalent of an ordinary stamp mill, and there crushed and washed. As that portion of the ore, which carries the copper, silver and gold is heaviest, it remains in the jigs and on

the slime tables, while the silica and other rock is washed away as tailings. It has always been found extremely difficult to save the fine, pulverized ore, and even now considerable copper is lost in the tailings.

Two kinds of furnaces are used in the smelters, the reverberatory and blast. Experience has demonstrated that the latter does its work more economically, and therefore the tendency at the present time is to make the blast furnace do as much of the work as practicable.

The blast furnace is, in effect, a long vertical cylinder into which coke for fuel and ore for treatment are fed together. A strong draught is formed by forcing air up through from the bottom, and a heat is generated which causes the ore to melt rapidly.

A reverberatory furnace is so named because the blaze from a coal fire is forced against a low arched roof from which is reverbrates, or is driven back on the ore below, causing it to become molten and remain in a liquid state until the slag can be skimmed or tapped off, and the matte secured.

Fine, pulverized ores and concentrates can be treated successfully in reverberatory furnaces; but it is necessary to first desulphurize them. This is done by roasting. The fine ores and concentrates are put into a roasting furnace and brought up to a temperature where the sulphur fuses and passes away in gasses or fumes. These furnaces are necessarily of a complicated character because it is necessary to slowly stir the ore while it is roasting.

The blast furnaces cannot be used successfully on concentrates and other fine ores, as they would either obstruct the draught or be blown away by it. Coarse ores, however, which do not contain too large a proportion of silica, can be treated in the blast furnaces without the necessity of previously desulphurizing them.

All arguments to the contrary notwithstanding it would therefore seem that the reverberatory furnace must continue to play a part in the smelting operations of Butte. Even if the concentrator is abolished fine ores will still result from the handling of the coarse ones, and as it would of course be impracticable to throw them away, either the reverberatory furnace of some new method must be used in their treatment.

As rapidly as the ores are melted in the blast furnace they are tapped off into a receiver, in which they are kept in a

molten condition while the slag rises and is tapped off. The lower strata in this receptacle runs about 55 per cent. copper, and is called matte. The matte from both the blast and reverberatory furnaces is run down, still molten, into a huge pot, which is hoisted by a gigantic crane and carried to the converter.

A blast of air is forced up through a series of small holes in the botom of the converter, and a heat so intense is created that the rock, iron, sulphur and whatever other foreign matter remains in the matte is oxidized or burned and the contents reduced to black copper, which runs about 98 per cent. to 99 per cent. fine.

When the black copper comes from the converter it is run into sheets, about an inch thick, and 1½ by 2½ feet. These are called annodes. The annodes are suspended in an electrolytic bath, and a heavy electric current forced through them. The current finds its way through the liquid to the cathode, which is at first a very thin sheet of copper, also suspended in the bath. The combined action of the electric current and the chemical bath cause the annode to rapidly dissolve. It is then taken up by the cathode, on to which it is deposited as the fine metal known to the trade as electrolytic copper.

As soon as the annodes decrease sufficiently so that they are in danger of breaking apart they are taken out and sent to the melting pot, where they are again cast into annodes. The cothodes are sometimes sent direct to the markets, but more commonly are cast into ingots before shipment.

Whatever silver and gold there is in the ores is carried with the copper to the electrolytic bath, and here it is deposited in the form of a mud in the bottom. This mud is taken out and treated in reverberatory furnaces, and the silver secured much as is the copper from the concentrates and fine ores.

The managements of the several smelters in the Butte district know exactly what losses are made in the various stages of ore treatment. Samples of concentrates, slimes, tailings, slags, matte, etc., are taken every hour in the day, and careful analyses made in the private labratories connected with all of the smelters. The effort at all times is to keep losses down to a minimum, and, if possible, to effect further savings. New systems and devices are constantly being tried, and tests are made so systematically and records so carefully kept, that the exact effect of these can be noted instantly.

THE COMING ELECTION IN MONTANA.

In Montana this Fall will be fought one of the bitterest and at the same time most unique political contests ever waged. The personal fights between Marcus Daly and W. A. Clark, and the mining litigation between F. A. Heinze and the Amalgamated and Boston & Montana companies will be the issues of the campaign.

F. August Heinze will manage the campaign of the Clark faction, which has been recognized as the regular Democratic party. Mr. Heinze has been a staunch Republican all his life, but it would seem that he considers his present action to be in keeping with his fight against the Amalgamated Copper Company. The eight-hour movement, alleged to have been started among the miners by Mr. Heinze, is being agitated by the Clark newspapers, and will form an important issue in the campaign.

On the other hand three new Republican daily newspapers are being started in the leading cities of Montana. Clark people claim that the Amalgmated Copper Company is backing these papers, and that its object is to get hold of the machinery of the State Government.

At one time it looked as if there would be splits in both parties. Later the factions got together, and the Republicans and anti-Clark Democrats will work together to defeat the Heinze-Clark combination in State politics.

Should the latter win in the State it would put them in a position to harrass the Amalgamated and Boston & Montana in the courts more severely than they have in the past. In such an event the present local judge of Silver Bow county would continue in his position, and it is probable that another, of his peculiar ideas of justice, would become a member of the Supreme Court of the State. This would leave the Eastern interests in the Butte copper mines dependent on the two remaining members of the latter body.

The outcome of the Montana election will be watched for with much interest by New York and Boston people who own copper stocks.

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